SHORTER COMMUNICATIONS

EPIDIDYMITE FROM MONT ST. HILAIRE, QUEBEC

J. A. MANDARINO AND D. C. HARRIS*
Department of Mineralogy, Royal Ontario Museum, Toronto

INTRODUCTION

Historical Review

Epididymite was described by Flink (1893) from Narsarsuk, Greenland. Chemically the mineral was identical to eudidymite ($NaBeSi_3O_7OH$) but proved to be crystallographically distinct. Since the original description, epididymite has been found at the following localities: Island of Arö, Langesundfjord, Norway (Sjögren, 1900); Lovozero and Khibina massifs, Kola Peninsula, U.S.S.R. (Semenov & Saltykova, 1954; Shilin & Semenov, 1957; Vlasov *et al.* 1959); and Vezna, Czechoslovakia (Černý, 1963).

In 1964 Mr. Jacques Bradley, a mineral collector living in St. Hilaire, Quebec, submitted to the writers a number of specimens for identification from the Desourdy Quarry on Mont St. Hilaire. One of Mr. Bradley's minerals was identified as epididymite.

Location and geological environment

Mont St. Hilaire, one of the Monteregian Hills, is about twenty miles east of Montreal. The geology is summarized in a general paper by Chao, Harris, Hounslow, Mandarino & Perrault (1967).

MINERALOGY OF EPIDIDYMITE

General features and appearance

Two types of epididymite have been found so far at Mont St. Hilaire. The first occurrence consists of euhedral crystals which are tapering pseudo-hexagonal prisms. The pseudo-hexagonal "prism" zone consists of {110} and {010}. Most of the crystals are only a few millimetres in dimension and the maximum dimensions are $3 \times 3 \times 5$ mm. All the euhedral crystals are covered with a soft greyish-brown coating which produces a poor, diffuse x-ray pattern.

The second type of epididymite examined during this study consists of translucent to transparent radiating groups of lath-shaped crystals which

*Present address: Mineral Sciences Division, Mines Branch, Department of Energy, Mines & Resources, 555 Booth Street, Ottawa, Ontario.

are elongated parallel to the *b*-axis. *X*-ray and optical goniometric measurements show that each individual is terminated by small faces of {110} and that each fragment is a multiple twin. These crystal groups from Mont St. Hilaire are similar to those shown by Černý (1963).

Crystallographic characteristics

Crystallographic data for epididymite have been published by several workers and have been summarized by Černý (1963). The Mont St. Hilaire epididymite yields essentially the same *x*-ray pattern as Černý's material, and consequently we have limited our single-crystal work to a partial study. Unit cell dimensions were calculated from the indexed powder pattern. Data for Mont St. Hilaire epididymite are:

Space group	Pnam
a	12.72 Å
b	7.34 Å
c	13.62 Å
$a:b:c$	= 1.733:1:1.856

Table 1 gives indexed *x*-ray powder diffraction data for epididymite from Mont St. Hilaire.

Physical and optical properties

Epididymite has a hardness of about $5\frac{1}{2}$ and a pronounced cleavage parallel to {001}. The specific gravity measured by means of the Berman micro balance is 2.61. The specific gravity calculated from the unit cell parameters and the theoretical composition is 2.56.

Optically the Mont St. Hilaire epididymite is biaxial, 2V(negative) is very small; $\alpha = 1.539$, $\beta = 1.543$ and $\gamma = 1.544$ (all ± 0.002). The optical orientation ($a = \alpha$, $b = \gamma$) was made on a small cleavage flake whose crystallographic orientation had been determined previously by means of a precession photograph. These optical data are essentially the same as those of Černý (1963) for material from Czechoslovakia and Greenland.

Association

The first type of epididymite crystals were collected from a single vug. Most of them were loose, although a few were implanted on serandite and analcime. Later in the development of the quarry, a second vug was discovered which yielded a large matrix specimen. On this specimen, epididymite was implanted on albite, analcime, aegirine, eudialyte, and natrolite. At the present time we can only say then, that epididymite is later than albite, analcime, aegirine, eudialyte, natrolite and serandite.

TABLE 1. *X*-RAY POWDER DIFFRACTION DATA FOR EPIDIDYMITE FROM MONT ST. HILAIRE, QUEBEC

Camera diameter 114.6 mm. Ni-filtered Cu radiation. Intensities estimated visually. Interplanar spacings calculated by IBM 7090 computer.

hkl	*d*(calc.Å)	*d*(obs.Å)	*I*	*hkl*	*d*(calc.Å)	*d*(obs.Å)	*I*
002	6.825	6.83	1	521	2.068	2.067	1
200	6.365	6.36	9	332	2.024	2.023	2
110	6.359			424	1.966	1.963	3
111	5.764	5.77	7	134	1.965		
202	4.655	4.65	7	316	1.934	1.931	1
112	4.652			026	1.934		
310	3.674	3.67	7	620	1.837	1.837	2
020	3.670			040	1.835		
121	3.414	3.40	10	140	1.816	1.816	1
004	3.412			334	1.801	1.800	8
312	3.235	3.23	3	141	1.800		
022	3.232			711	1.751		
400	3.182	3.18	6	614	1.750	1.749	2
220	3.179			531	1.750		
221	3.096	3.09	10	241	1.749		
204	3.008	3.00	10	623	1.703	1.702	3
114	3.007			335	1.674	1.672	½
402	2.884	2.883	1	341	1.672		
222	2.882			713	1.646		
223	2.606	2.604	4	533	1.645	1.644	6
314	2.500	2.495	7	243	1.644		
024	2.499			721	1.618		
510	2.405			624	1.617	1.616	½
420	2.404	2.400	3	044	1.616		
130	2.403			631	1.592		
404	2.327	2.324	½	800	1.591	1.590	1
224	2.326			440	1.590		
422	2.268	2.266	4			1.549	5
132	2.266					1.477	2 brd
		2.158 to 2.100	4 (wide band)			1.451	2
						1.388	3
						1.363	3
						1.327	3
331	2.094	2.094	½			1.283	5 brd
520	2.092						

ACKNOWLEDGMENTS

The writers gratefully acknowledge the assistance of Mr. Jacques Bradley who supplied several specimens for this study. A special tribute should be paid to Mr. Bradley for his unusual powers of observation. We also wish to thank Professor Guy Perrault and Mr. Frank Melanson for introducing us to the quarry, and Dr. Michael Fleischer of the United States Geological Survey for supplying information on other occurrences of epididymite.

References

ČERNÝ, P. (1963): Epididymite and milarite—alteration products of beryl from Vezna, Czechoslovakia. *Min. Mag.* **33**, 450–457.

CHAO, C. Y., HARRIS, D. C., HOUNSLOW, A. W., MANDARINO, J. A., & PERRAULT, G. (1967): Minerals from the nepheline syenite, Mont St. Hilaire, Quebec. *Can. Min.* **9**, 109–123.

FLINK, G. (1893): Om några mineral frŏn Grönland of Gust. Flink: *Geol. Foren. Förh.*, **15**, 201.

SEMENOV, E. I. & SALTYKOVA, V. S. (1954): Epididymite in alkali pegmatites of the Lovozero and Khibiny massifs—*Trudy Laboratarii Mineralogii i Geokhimii Redkikh Elementov A N SSSR.* 1: 45–48.

SHILIN, L. L. & SEMENOV, E. I. (1957): The beryllium minerals epididymite and eudidymite in the alkalic pegmatites of the Kola Peninsula: *Doklady Akad. Nauk. U.S.S.R.* **112**, 325–328.

SJÖGREN, H. (1900): A chemical investigation of some minerals from Lillie Arøe and Øvre Arøe in the firth of Langesund: *Bull. Geol. Inst. Upsala*, **4**, 227.

VLASOV, K. A., KUZ'MENKO, M. Z., & ESKOVA, E. M. (1959): (English Edition, 1966). *The Lovozero Alkali Massif.* Oliver and Boyd Ltd., Edinburgh and London.

Manuscript submitted June 12, 1968, emended July 16, 1968

FROHBERGITE, MONTBRAYITE, AND A NEW Pb–Bi TELLURIDE

JOHN RUCKLIDGE[1]

Abstract

The composition of frohbergite, $FeTe_2$, has been confirmed from the original locality at Robb Montbray, Quebec, and electron probe studies have revealed new associations with chalcopyrite and melonite. Frohbergite has also been found in material from Noranda, Quebec, and Lindquist Lake, B.C. Montbrayite has been analysed, and found to contain small but probably essential amounts of Bi and Pb.

This note describes new data, acquired with the electron probe, on some rare telluride minerals from three Canadian localities.

Samples have been taken from the Peacock collection at the University of Toronto and for the most part have been studied previously. Often x-ray identifications have been performed by earlier investigators, and in this study only information accessible through the electron probe and ore microscope has been collected. An ARL, model EMX, probe has been used, and the data processed by computer by a programme written for the purpose at Toronto (Rucklidge, 1967). Standards for the most part have of

[1]Dept. of Geology, University of Toronto.